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Trends in Biosecurity Practices on U.S. Equine Operations

Biosecurity practices are vital to the health of domestic animals. Biosecurity practices include measures that reduce risk of disease introduction on an operation, such as controlling insect and animal vectors and isolating animals when they arrive or return to the operation.

One priority in the U.S. Department of Agriculture's (USDA) National Animal Health Monitoring System's (NAHMS) Equine 2005 study was to compare changes in the equine industry from 1998 to 2005 in relation to biosecurity measures practiced on equine operations.

For the Equine 2005 study, NAHMS collected data on equine health and management practices from a representative sample of operations with 5 or more equids in 28 States within 4 regions.* The 28-State target population represented 78.0 percent of equids and 78.6 percent of operations with 5 or more equids in the United States. Interviews were conducted from July 18 through August 12, 2005, and 2,893 equine operations provided data on equine health and management.

Some estimates in this information sheet are compared to estimates from Equine '98, NAHMS' previous study of the U.S. equine industry. For the evaluation of changes and trends, the data used to generate estimates based on the Equine '98 study were re-analyzed to represent operations with five or more equids present on January 1, 1998. Therefore, estimates for comparing the two study periods are based on three points of commonality: same 28 States, data collection performed by National Agricultural Statistics Service enumerators, and same reference population of 5 or more equids.

The percentage of operations identifying their primary function as "farm/ranch" increased from 30.1 percent in 1998 to 40.3 percent in 2005, while the percentages of operations identifying their primary function as "residence with equids for personal use" were similar, with 38.3 percent in 1998 and 37.0 percent in 2005. A resident equid was defined as an equid that spent or was expected to spend more time at the operation, its home base, than at any other operation, whether or not it was present at the time of the interview.

*Regions:

West: California, Colorado, Montana, New Mexico, Oregon, Washington, and Wyoming

Northeast: New Jersey, New York, Ohio, and Pennsylvania

South: Alabama, Florida, Georgia, Kentucky, Louisiana, Maryland, Oklahoma, Tennessee, Texas, and Virginia

Central: Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, and Wisconsin.

General Practices

General management practices that affect biosecurity on equine operations include contact with other animals, potential contamination of feed and water, and insect control.

Contact with other animals

A few diseases are transmitted to equids via other animal species. Awareness of contact between equids and other animal species can lead to preventive measures and a more timely response to a disease outbreak.

The percentage of operations where poultry had direct contact with resident equids or their feed increased from 13.4 percent in 1998 to 18.6 percent in 2005 (table 1). The percentage of operations where cattle had direct contact with resident equids or their feed increased from 34.1 percent in 1998 to 43.2 percent in 2005. The increase in equid contact with cattle and poultry may be a result of the higher percentage of operations with farm/ranch as a primary function in 2005 compared to 1998.

Table 1. Percentage of operations where the listed animals had physical contact with resident equids or their feed:

Animal	Percent Operations	
	1998	2005
Animal	Percent	Percent
Poultry	13.4	18.6
Pigs	3.7	4.7
Cattle	34.1	43.2
Sheep/goats	11.4	13.9
Llamas/alpacas	1.5	2.4
Emus/ostriches	1.0	1.2
Dogs	77.9	76.9
Cats	67.7	66.4

Feed and water management

Contamination of feed and water by outside sources is a potential route of infection for equids. The percentage of operations that fed grain concentrate/energy source beyond hay or pasture during the previous 12 months was slightly higher in 1998 than in 2005 (95.9 percent and 90.1 percent, respectively).

For operations that fed grain concentrate/energy source during the previous 12 months, the percentage of grain/concentrate by feed source was averaged over all

operations. The highest percentage was purchased in bags from a retail source in both 1998 and 2005 (82.5 percent and 79.1 percent, respectively). Intact bags should provide a layer of protection against possible contamination. Other sources of grain concentrate/energy source included bulk delivery from a retail source (6.3 percent in 1998 and 9.6 percent in 2005) and home-grown (7.4 percent in 1998 and 7.9 percent in 2005).

The percentage of operations that stored grain/concentrate in a manner to prevent fecal contamination by mice or rats increased from 77.6 percent in 1998 to 85.0 percent in 2005. In 1998, the questionnaire asked if feed was stored in rodent-proof containers, and the change from more-specific to less-specific wording might account for some of the increase.

The main sources of drinking water for equids were similar in 1998 and 2005, with well water being the predominant source of water for equids on more than half the operations in both 1998 and 2005 (table 2).

Surface water presents the greatest concern of disease exposure because it is difficult to control water quality; about one-fifth of operations in each study used surface water as the primary water source for equids.

Table 2. Percentage of operations by predominant source of drinking water for resident equids during the previous 12 months:

Source	Percent Operations	
	1998	2005
Source	Percent	Percent
Well	58.9	57.5
Public/municipal water supply	17.2	18.9
Spring	5.2	5.4
Surface water (pond, stream, river, or cistern)	18.2	18.1
Other	0.5	0.1
Total	100.0	100.0

Insect control

Insect control is vital to the health of equids. Insects transmit disease agents, and large infestations of insects can weaken an equid's immune system. For both studies, approximately 9 of 10 operations practiced some form of insect control. The listed methods of insect control were not mutually exclusive, as operations could have used various combinations of insect control.

The most common method of insect control reported in both studies was repellents applied to equids, although its use decreased from 86.5 percent in 1998 to 73.1 percent in 2005 (table 3). The percentages of operations that used insecticides applied in or near equine housing area and insecticides applied on pastures increased from 1998 to 2005. Several methods of insect control that were common "write-in" methods in 1998 were added to the 2005 questionnaire: bug zapper,

fly sheet on equids, mosquito treatment in drinking water, water container emptied at least weekly, frequent removal of manure and weeds from premises, and screened-in stalls. Two of these options—water container emptied and refilled with fresh water at least weekly and frequent removal of manure and weeds—were the second and third most frequently used methods of insect control in 2005. The methods added in 2005 probably account for the decrease from 1998 to 2005 in the percentage of operations that listed "other" as a method of insect control.

Table 3. Percentage of operations where the listed insect-control methods were used during summer:

Method	Percent Operations	
	1998	2005
Method	Percent	Percent
Repellents applied to equids	86.5	73.1
Insecticides applied in or near equine housing area	26.1	36.0
Insecticides applied to pasture areas	1.2	5.5
Regional control program, such as aerial spraying	2.5	4.1
Sticky tape	26.7	20.9
Bug zapper	N/A	8.4
Parasitic wasps specifically brought onto operation	2.4	3.1
Face mask on equid	32.3	27.2
Fly tags attached to equine halters	3.5	4.1
Fly sheets on equid	N/A	7.3
Insect control product in feed, such as using Equitrol®	2.8	5.6
Mosquito treatment in drinking water (mosquito dunks)	N/A	6.3
Water container emptied and refilled with fresh water at least weekly	N/A	58.5
Frequent removal of weeds and manure from premises	N/A	51.3
Screened-in stalls	N/A	2.4
Other	13.1	5.9
Any method	91.3	88.9

Practices Related to Introduction of Equids on the Operation

Contact between resident and other equids is one means of disease transmission. The percentage of operations that introduced a new animal—either a

nonresident and/or a new resident—during the previous 12 months decreased from 50.4 percent in 1998 to 33.6 percent in 2005. A nonresident equid was defined as an equid that visited the operation for fewer than 30 consecutive days during the previous 12 months. A new resident equid was defined as a purchased animal, a new boarder, or other acquired equid considered from that point on to be a resident. For operations that introduced equids in 1998, about 0.80 nonresident or new resident equid was introduced for each resident equid; in 2005, approximately one (0.95) nonresident or new resident equid was introduced for each resident equid. The increase in introduced equids relative to residents—despite the decline in the percentage of operations introducing a new equid—might reflect the decrease in the percentage of large operations (20 or more equids) from 39.4 percent in 1998 to 29.7 percent in 2005.

Nonresident equids

The percentages of operations with 0, 1 to 9, and 10 or more nonresident equids that stayed fewer than 30 consecutive days were similar in 1998 and 2005 (table 4). Approximately 8 of 10 operations in 1998 and 2005 had no nonresident equid visitors during the previous 12 months. For operations that had nonresident equids, the majority had fewer than 10 nonresident equids visit during the previous 12 months.

Table 4. Percentage of operations by number of nonresident equids that stayed on the operation for fewer than 30 consecutive days during the previous 12 months:

	Percent Operations	
	1998	2005
Number Nonresident Equids	Percent	Percent
0	79.1	81.0
1 to 9	15.4	14.7
10 or more	5.5	4.3
Total	100.0	100.0

Methods that reduce the risk of nonresident equids introducing disease agents to an operation include evaluation of the health status of nonresidents (e.g., through exams, preventive treatments, and/or testing requirements), vaccination and deworming requirements, and quarantine or isolation prior to contact with resident equids.

For operations that had nonresident equids that stayed fewer than 30 consecutive days, the percentages of operations that implemented the health requirements listed in table 5 for nonresident equids were similar in 1998 and 2005. In both studies, the most common health requirements implemented at least some of the time for nonresident equids were a Coggins test for equine infectious anemia (EIA), vaccination, and deworming within the past year. In 2005, three choices were added to

the health-requirement category: screening test for strangles or history of no occurrence in past 6 months, other past medical history, and quarantine prior to contact with resident equids. It is unlikely that these additional choices altered the response to the other choices because the choices for health requirements were not mutually exclusive (e.g., operations could implement more than one of the requirements for nonresident equids).

Table 5. For operations with nonresident equids that stayed for fewer than 30 consecutive days during the previous 12 months, percentage of operations by frequency that the following health requirements were always or sometimes implemented for the majority of nonresident equids:

Health Requirement	Percent Operations	
	1998	2005
Health Requirement	Percent	Percent
Official health certificate (CVI)	31.9	24.8
Veterinary examination other than CVI	30.7	18.4
Coggins test (EIA test, swamp fever test)	50.2	45.3
Vaccination within past year	43.5	36.3
Deworming within past year	43.2	33.6
Screening test for strangles or history of no occurrence in past 6 months	N/A	9.7
Other past medical history from owner	N/A	21.8
Quarantine prior to contact with resident equids	N/A	17.2
Other	10.6	3.8

New resident equids

The percentage of operations that added new resident equids and the percentage of resident equids added both decreased from 1998 to 2005 (table 6). Operations with primary functions of farm/ranch and residences with equids for personal use accounted for much of the difference, with a smaller percentage of operations with these primary functions indicating addition of new residents in 2005 compared to 1998.

Table 6. Percentage of operations that added new resident equids during the previous 12 months and percentage of equids added, including foals not born to a resident mare (excluding births):

Measure	Percent	
	1998	2005
Measure	Percent	Percent
Operations	40.5	21.5
Resident equids*	11.3	6.3

*Total number of equids added to resident equine population x 100/total resident equine inventory.

For both studies, operations that added new resident equids during the previous 12 months most commonly required a Coggins test for EIA for new additions at least some of the time; a similar percentage of operations required a Coggins test in each study (table 7). Vaccination remained an important requirement. The percentage of operations requiring deworming within the past year decreased, as did the percentages of operations requiring a CVI or other veterinary examination. As noted previously, three additional choices for health requirements were added in 2005: screening test for strangles or history of no occurrence in past 6 months, other past medical history from owner, and quarantine prior to contact with resident equids. The health-requirement choices were not mutually exclusive, so it is unlikely that responses to the first five categories were influenced by the new choices. The percentage of "other" requirements decreased from 13.0 percent in 1998 to 5.0 percent in 2005, likely because of the above-mentioned choices added to the 2005 questionnaire.

Table 7. For operations that added new resident equids during the previous 12 months, percentage of operations that always or sometimes implemented the following health requirements for new additions:

Health Requirement	Percent Operations	
	1998	2005
Health Requirement	Percent	Percent
Official health certificate (CVI)	53.1	34.6
Veterinary examination other than CVI	45.1	29.2
Coggins test (EIA test, swamp fever test)	67.2	61.8
Vaccination within past year	57.0	49.2
Deworming within past year	65.8	48.9
Screening test for strangles or history of no occurrence in past 6 months	N/A	14.2
Other past medical history from owner	N/A	36.3
Quarantine prior to contact with resident equids	N/A	32.0
Other	13.0	5.0

Practices Related to Contact with Equids Off the Operation

The percentage of operations where resident equids left the home operation and returned after having direct contact with outside equids decreased from 87.3 percent in 1998 to 75.1 percent in 2005. Equids that leave the home operation and have contact with outside equids may be exposed to disease agents and introduce these agents to the home operation upon return. Isolating

returning equids is one way to prevent this type of disease introduction.

For operations that had resident equids that left the home operation and returned after direct contact with outside equids, the percentages of operations that routinely isolated returning equids were similar in 1998 and 2005 (table 8). The percentage of operations that isolated returning equids due only to disease or exposure to disease increased from 15.8 percent in 1998 to 26.0 percent in 2005. The percentage of operations that never isolated returning equids decreased from 72.3 percent in 1998 to 60.6 percent in 2005.

Table 8. For operations that had resident equids that left the home operation and returned after direct contact with outside equids, percentage of operations by infection-control practice used for returning equids:

Infection-Control Practice	Percent Operations	
	1998*	2005
Infection-Control Practice	Percent	Percent
Routinely isolate returning equids	11.9	10.6
Only isolate returning equids for a cause such as disease or exposure to disease	15.8	26.0
Quarantine before arrival at home operation	N/A	2.8
Never isolate returning equids	72.3	60.6
Total	100.0	100.0

*Categories for 1998 were resident equine never leave premises, routinely isolated returning equine, isolated returning horses for a cause such as evidence of or exposure to disease, and never isolated returning horses.

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